

# Information Technology and Organizational Capital

Erik Brynjolfsson<sup>1</sup>, Lorin Hitt<sup>2</sup> and Adam Saunders<sup>3</sup>

In order to realize the potential benefits of computerization, firms may need to invest in additional assets such as organizational processes and worker knowledge. We investigate this hypothesis by combining our own data with that of the Census Bureau in order to find new ways of measuring organizational capital and to determine how firms can best take advantage of technology. In particular, by measuring these changes to the supply chain, we seek to understand the broader implications of technology in the workplace. Our research may shed light on the nature of the recent productivity revival and clarify the factors which are most important to its future sustainability.

In our prior work, we utilized a survey instrument administered to approximately 400 large firms to estimate a firm's stock of organizational assets, specifically the use of decentralized decision rights and greater investments in human capital. Our results suggested that firms which also made investments in these organizational practices gained greater benefits from their investments in computers when measured in terms of firm productivity or firm market value (Brynjolfsson, Hitt and Yang, 2004; Bresnahan, Brynjolfsson and Hitt, 2003). Utilizing the Census Bureau's National Employer Survey and the Computer Network Use Supplement (along with other data from the Census Bureau and Compustat), we are able to construct new measures of organizational assets. These measures enable us to replicate and extend our earlier results, potentially extending our analysis to a much broader sample of firms and enabling the use of alternative measures of the organizational assets we identified previously. As well, new dimensions of organizational capital suggested by theory, but unmeasured in our prior work, can be captured.

Using an estimating framework that relates the market value of a firm to the stocks of various assets (including property plant and equipment, computers, organizational assets and other balance sheet assets), we can estimate the implied market value of various types of assets. While we find that the market values one dollar of installed property plant and equipment at very close to one dollar, computer assets consistently show larger market valuations – to the extent of exceeding \$10 per dollar of installed capital stock. It appears that this “excess valuation” of computers is concentrated in firms that simultaneously make substantial investments in organizational capital (as we measure it) along with their computer investments. Our results suggest that computers are most valuable when coupled with complementary organizational assets. In addition, and the apparent high valuation of computers is in part explained by the presence of complementary organizational assets, which are typically not captured by normal balance sheet asset accounting.

We are working to extend these results to additional measures of organizational capital and develop additional estimation approaches. Thus, we can further examine the productivity effects of these organizational assets and consider how this value accrues over time. In preliminary productivity equations, we find evidence that firms which combine computers with complementary business processes have higher productivity than firms without these complementary processes; as well, this value grows over a three-year period. Our goal is to lay a foundation for improved measurement of the computer and organizational assets most relevant to the performance of an information-based economy.

---

<sup>1</sup> Schussel Professor of Management, MIT Sloan School of Management. (erikb@mit.edu)

<sup>2</sup> Alberto Vitale Term Associate Professor of Operations and Information Management, The Wharton School, University of Pennsylvania. (lhitt@wharton.upenn.edu)

<sup>3</sup> PhD Candidate, MIT Sloan School of Management. (adamrs@mit.edu)